Case Report

Paraganglioma of the nasal cavity

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INTRODUCTION

Paragangliomata of the head and neck, although a recognised entity, are extremely rare tumours and will be encountered by only a few clinicians. Furthermore, the nasal cavity and nasopharynx are among the least common sites in which this neoplasm may arise. We describe a case of a paraganglioma of the nasal cavity mucosa and draw attention to the difficulties encountered in predicting the biological behaviour of these uncommon tumours.

CASE HISTORY

A twenty-four year-old caucasian male was referred to the ENT outpatient department complaining of left-sided nasal obstruction and recurrent epistaxis of a few weeks' duration. Anterior rhinoscopy revealed the presence of a polypoid lesion in the posterosuperior aspect of the left nasal cavity, the appearance of which was suggestive of an angiofibroma. The patient was also noted to be mildly hypertensive. Computed tomography confirmed the presence of a lobular soft tissue mass in the left side of the nasal cavity extending posteriorly into the nasopharynx with associated thinning and lateral displacement of the nasal septum but there was no evidence of lateral extension into the pterygopalatine fossa.

Histological examination of a small incisional biopsy specimen showed features of a neuroendocrine tumour, most likely a paraganglioma. A lateral rhinotomy was performed; at operation, a pink pulsatile exophytic tuniour measuring five cm in diameter was seen arising from the mucosa of the posterosuperior nasal cavity and extending into the ethmoid sinus. Of interest is the fact that the patient's blood pressure fluctuated more than would have been expected during the procedure. The lesion was completely excised and the patient remains well fifteen months after surgery.

HISTOLOGICAL FEATURES

The surgical specimen consisted of multiple fragments of firm pale grey tissue weighing 39g in total. Histological examination of haematoxylin- and eosin-stained material showed an ulcerated and highly vascularised turnour consisting of mildly pleomorphic polygonal "chief" cells with eosinophilic cytoplasm and a granular nuclear chromatin distribution. The tumour cells were arranged in infiltrative trabeculae and nests with a vague *zellballen* pattern (Fig. 1); occasional mitotic figures were noted. Histochemical reticulin staining demonstrated a fine connective tissue network between the trabeculae and *zellballen* of tumour cells (Fig. 2). Neuroendocrine differentiation was confirmed by strongly-positive immunohistochemical staining for chromogranin

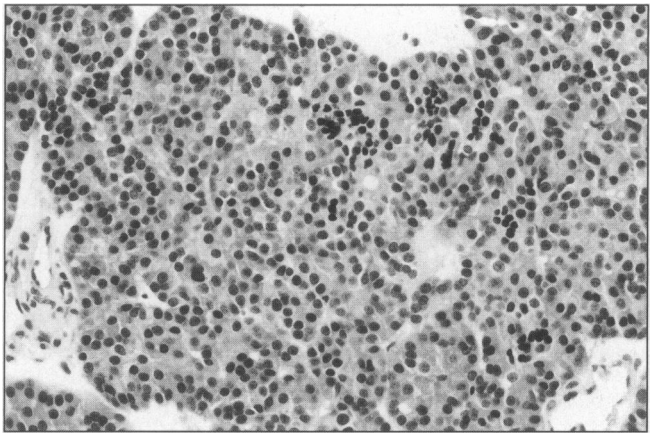

Fig 1. *Zellballen* architecture in paraganglioma (H&E, x100).

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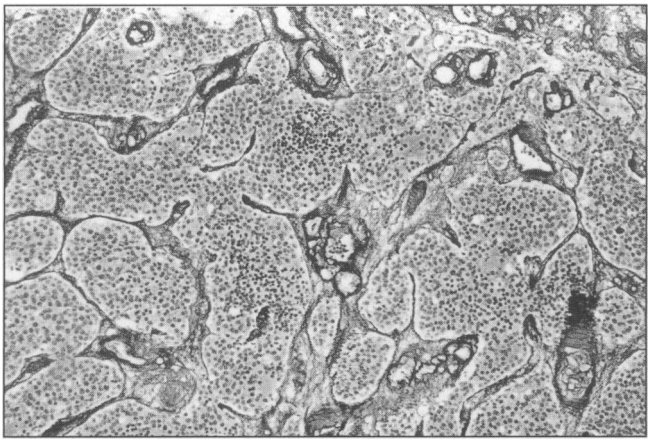

Fig 2. Fibrous stroma imparting *zellballen* pattern (reticulin, x40).

A and neuron-specific enolase. Antibodies directed against S-100 protein, a neural crest-derived antigen, identified sustentacular cells at the periphery of tumour nests, thus confirming the diagnosis of paraganglioma (Fig. 3). Electron microscopy demonstrated abundant dense-core neurosecretory granules within the polygonal chief cells and confirmed the presence of sustentacular cells surrounding the *zellballen.*

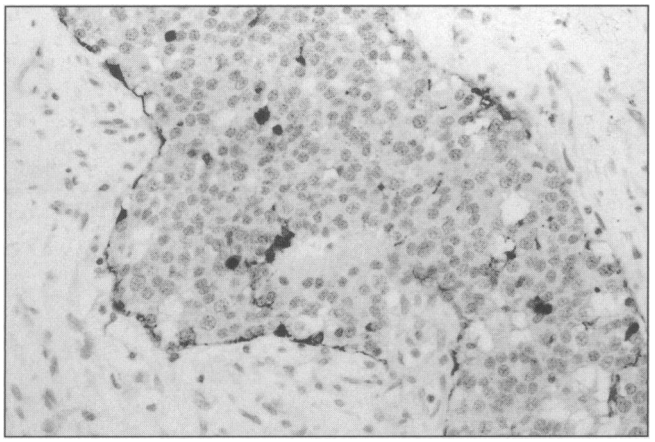

Fig 3. S100-positive sustentacular cells surrounding *zellballen* (immunoperoxidase, x100).

DISCUSSION

The extra-adrenal paraganglion system consists of focal collections of neuroepithelial chief cells arranged in *zellballen* nests encircled by a layer of Schwann-like S-100-positive sustentacular cells. Paraganglia. (and their neoplastic progeny) have been found in various locations within the head and neck, the most notable of which are the carotid bodies (giving rise to the classical chemodectoma). Paragangliomata of the nose and paranasal sinuses are extremely rare – a recent review identified twenty-five cases worldwide, only twelve of which arose from the nasal cavity mucosa[1]. It is generally accepted that these nasal neoplasms should be divided into two distinct groups based on their presumed anatomical origin; paragangliomata arising from the mucosa of the nasal cavity must be separated from tuniours which develop within extranasal paraganglia. (the most common sites of origin being the jugulotympanic, vagal and ciliary ganglia[2]) and invade the nasal cavity by direct growth. A different surgical approach is often required according to the site of origin of the tumour[3].

As with all neuroendocrine tuniours, it is frequently impossible to accurately predict the biological behaviour of individual cases; paragangliomata may exhibit a variable degree of cellular atypia and mitotic activity but the vast majority are clinically benign. Many authors maintain that morphological features cannot be used as the only criteria by which to diagnose malignancy. Invasion of bone or distant metastasis is the *sine qua non*[1].

Immunohistochemistry can be of help not only in diagnosis but may also assist with regard to prognosis[4] - Achilles et ar assessed the value of immunohistochernical staining for S-100 protein in the diagnosis and prognosis of paragangliomata and observed that malignant paragangliomata. were completely devoid of S-100-positive sustentacular cells; however, a small proportion of benign turnours were also lacking in sustentacular cells, thus making it difficult to reach an unequivocal conclusion about the reliability of this finding. Nonetheless, sustentacular cells were well represented throughout the turnour in the present case. It is also reassuring to note that only four of the reported nasal and paranasal paragangliomata have proven to be overtly malignant[1].

Ki-67, a nuclear antigen ubiquitously expressed by dividing cells during all active parts of the cell cycle, may well prove to be of diagnostic and prognostic significance. Karamitopoulou *et al*[6] studied Ki-67 immunoreactivity in central nervous system turnours (including three paragangliomata) for assessment of cell proliferation. They observed increased reactivity in each of the paragangliomata studied, a characteristic which contrasted with their benign morphological features. In the present case, over 18% of the tumour cells stained positive for Ki-67 using the M113-1 monoclonal antibody; this

reflected a much greater degree of cellular proliferation than one would have expected from the histological appearance and correlated with a Ki-67 labelling index of 18.7, considerably higher than the mean of 2.19 previously described. This intriguing finding warrants finther investigation to determine the ultimate value of Ki67 immunohistochemistry in predicting tumour behaviour, particularly in cases in which there is significant doubt regarding the adequacy of surgical excision. Local recurrence is an important complication of these turnours and should be viewed with deep suspicion and treated appropriately. Although the turnour in this case contained numerous sustentacular cells, the degree of cellular proliferation is worrying and suggests a high potential for local recurrence. The patient has since been closely reviewed every three months and remains well with no clinical or radiological evidence of recurrent disease fifteen months after surgery.

CONCLUSION

Nasal paragangliomata are exceedingly rare tumours but are an entity of which clinicians should be aware, particularly when they meet with a case of unilateral nasal obstruction or recurrent epistaxis. Although paragangliomata can provide diagnostic and prognostic difficulties, immunohistochemistry is proving to be a useful adjunct to routine histological examination. When dealing with neuroendocrine tumours of the head and neck, a thorough approach to surgery is obligatory as is vigilant follow-up[7].

ACKNOWLEDGMENTS

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